

# Elizabeth River Project Pru & Louis Ryan Resilience Lab

RESILIENCE FEATURES + KEY FACTS



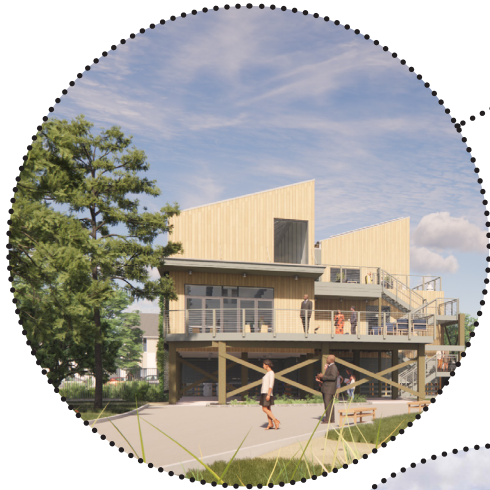
The Elizabeth River Project's new **Ryan Resilience Lab** will demonstrate accessible, approachable methods of resilience and sustainability for the homeowner, developer, or small business owner. Sustainability will be a primary focus, with the goal of reaching net zero energy usage. Solar power, rain water collection, and green roofs will be just a few of the highly-visible strategies employed on the building and site. The site will be a demonstration of emerging practices in coastal environmental resilience including carbon reduction. It will become a showcase for the Elizabeth River Project's signature living shorelines. Please explore the following five resilience goals on display at ERP's new Ryan Resilience Lab:

- **Adapt to a Changing Climate**
- **Absorb Flooding**
- **Energy and Environmental Resilience**
- **Cultural Resilience**
- **Planned Retreat**





# ADAPT TO A CHANGING CLIMATE



## Elevated building with flood-damage resistant structure

- Allows flood waters to advance and recede without compromising the building.
- All mechanical, electrical systems elevated above 100-year floodplain.
- Off-the-shelf materials achieve flood-proofing in an accessible way.

## On site energy production

- 80kWh solar panel array with battery backup.
- Net-zero energy use annually.



## Floating dock + sunlight permeable gangway

- Inherently resilient - will not be affected by rising sea levels.
- Will not impede growth of living shoreline.
- Constructed from fiberglass reinforced composites, which will virtually eliminate chemical contamination in the river.

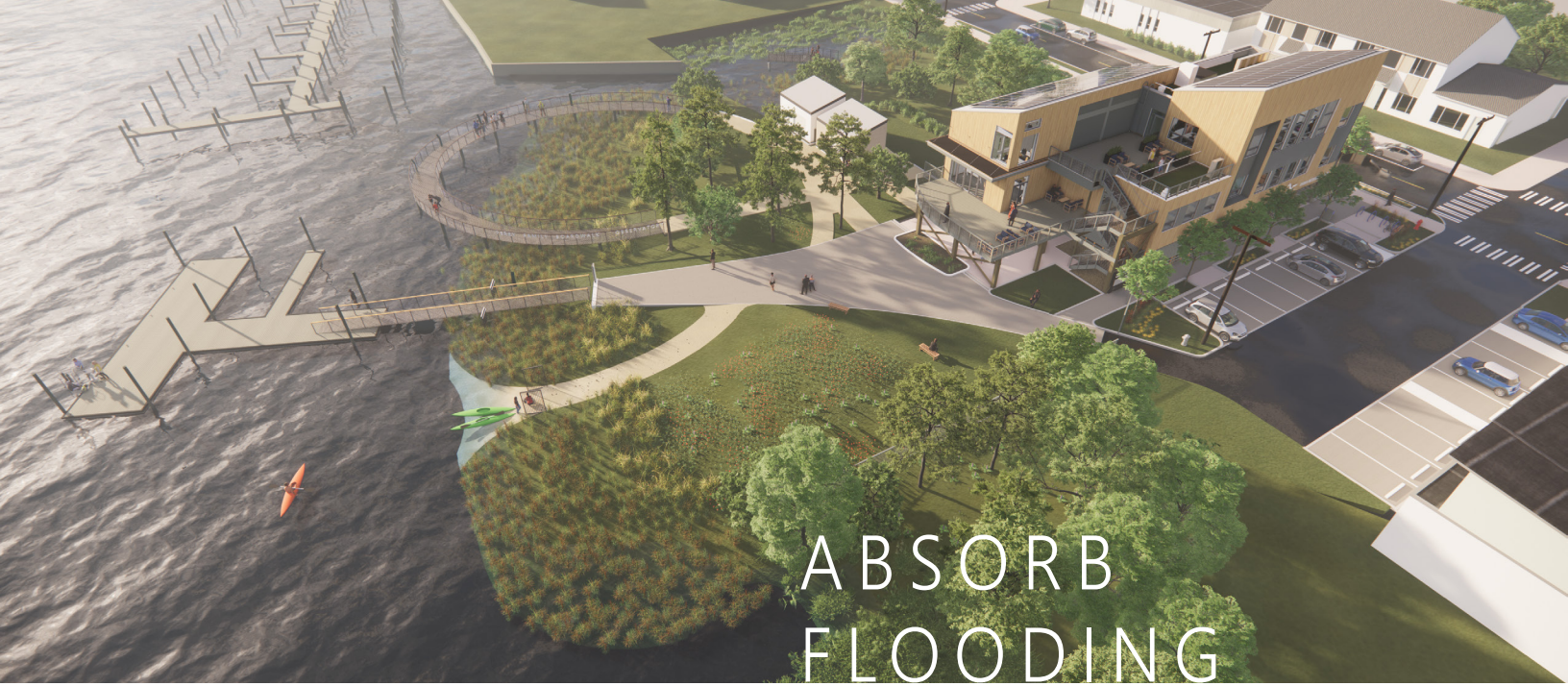
## Healthy interior building design

- Operable windows in every room allow fresh circulating air inside, as well as low-VOC materials contribute to a healthy interior environment.



## Storage building on amphibious platform

- Demonstration of practical application of commercially available dock floats



# ABSORB FLOODING



**Green roof to reduce storm water runoff  
Cisterns to collect and temporarily store rainwater**

- Will be used for site + green roof irrigation
- Possible gray-water re-use in the building

**Living Shoreline and site act as a single macro-scale raingarden, allowing ~100% of storm water to infiltrate naturally**

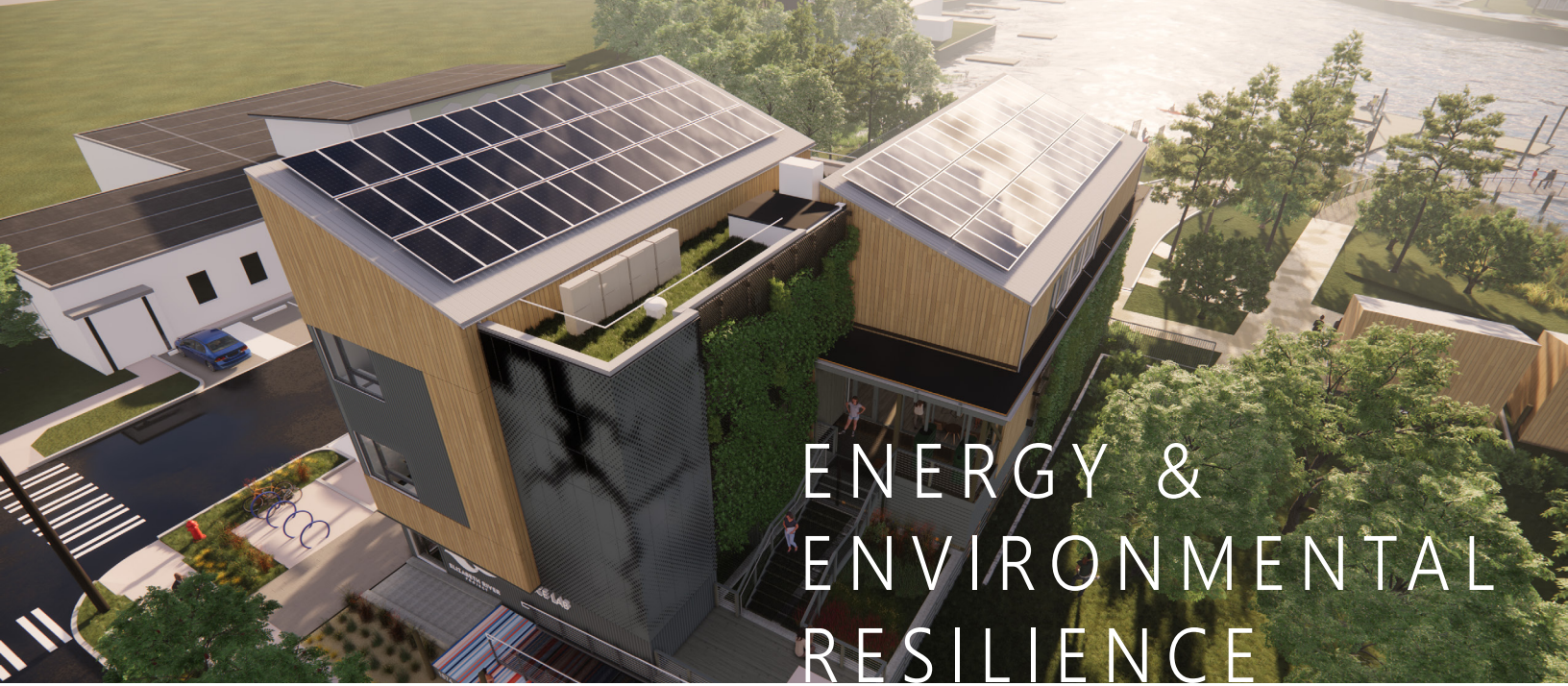


**Individual demonstration rain gardens (front plaza, outdoor classroom) connected to rain barrels**



**Pervious paving used at all uncovered parking and drive areas**

**Retention/restoration of shoreline and green space overall represents a net reduction in hardscape and a net increase in restored wetland and habitat restoration**



# ENERGY & ENVIRONMENTAL RESILIENCE



## Passive Design

- Building envelope insulated to far exceed code minimum; contributes to energy savings overall
- "Cool roof" at solar panel locations (non-green roof areas)
- Green walls on southern facades limit solar heat gain during the summer (energy use reduction)
- Green roofs reduce summer heat gain through roof, and reduce heat loss during winter
- Cool hardscape materials (gravel, permeable paving) to reduce heat island effect
- Building orientation along E-W axis to minimize glare and maximize passive solar heating/cooling



## Building Systems

- Generate on-site energy with solar panels
- High-efficiency HVAC systems (SEER 20-22)
- Solar hot water heating will augment centralized building water heater
- EV charging stations will encourage EV usage
- Operable windows will increase occupant comfort and reduce energy loading during shoulder seasons
- High-efficiency lighting (LED, daylight harvesting, daylighting strategies overall)



## Material Stewardship

- Building constructed from FSC-certified wood to reduce carbon footprint
- Recycled materials used wherever feasible



# CULTURAL RESILIENCE



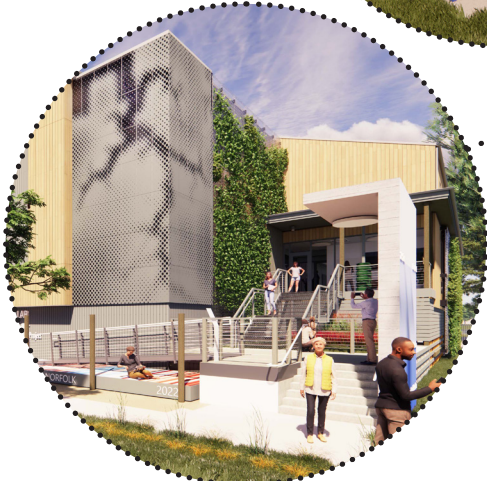
## Teaching Tool

- Partnerships with RISE, ODU, NSU, VIMS for research and site-specific installations.
- Didactic signage throughout site and building will explain various strategies and approaches.
- ERP staff will be a resource for interested citizens (Through various River Star Programs).



## Promotes and contributes to a healthy and ecologically sensitive community

- Public park – teaching tool that will engage with the community and give people a new way to experience the Elizabeth River.
- Alternative transit encouraged, including bicycle racks and EV charging stations.
- Access to waterways for recreational and educational boating.
- Encourage Colley Avenue to become an “Eco-Corridor”, building upon the work of UVA grad students in the “Blue Norfolk” study.
- Art/demonstrations in public realm – capture the imagination.



## Off-the-shelf components

- Results will be accessible to homeowners, business owners, etc.
- Will provide positive local economic impacts.



# PLANNED RETREAT



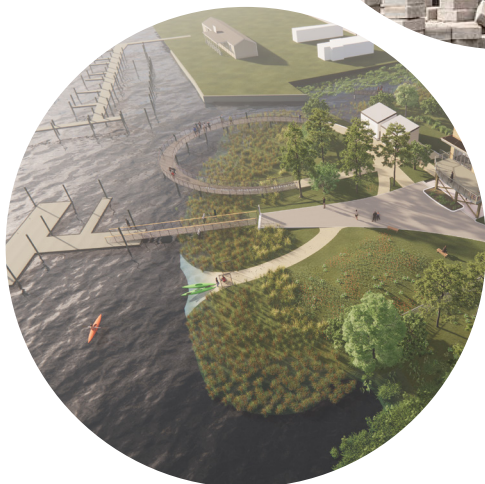
## First known redevelopment in the urban floodplain in Virginia to:

- Plan intentionally to model for environmental resilience by anticipating obsolescence
- Exclusively use building and site elements designed to do no harm after retreat
- Focus on cost-effective ways for homeowners and businesses to do it themselves
- Teach the design and construction community how to repeat these techniques in order to exponentially increase our region's resilience to coastal flooding and sea level rise



## Engineered 30-50-year lifespan

- Ensure that the building can be safely dismantled in the event that the site must be abandoned due to sea level rise.
- Leaving nothing on the site that would do harm to the environment.



## Rolling conservation easement along living shoreline

- Ensure that the site will be progressively preserved as sea levels rise